



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/887,225	06/22/2001	Ahmad Jalali	000141	7206
23696	7590	04/14/2005	EXAMINER	
Qualcomm Incorporated Patents Department 5775 Morehouse Drive San Diego, CA 92121-1714			KIM, KEVIN	
			ART UNIT	PAPER NUMBER
			2634	

DATE MAILED: 04/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/887,225	JALALI ET AL.	
	Examiner	Art Unit	
	Kevin Y Kim	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 June 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 24 and 25 is/are allowed.
- 6) ☒ Claim(s) 1, 4, 14, 16-23, 26, 27, 29-33, 35 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 15, 28, 34 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/15/01, 12/30/02</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1,4,5,8-10,17,26,27,29-33,35 are rejected under 35 U.S.C. 102(e) as being anticipated by Bao et al (US 6,792,049).

Claims 1, 26 and 27.

Bao et al discloses (see Fig.3) a method and apparatus for transmitting data from a transmitter (310) over a communication link (320) to a receiver (330) in a communication method in a time division duplexed communication system (see col.6, lines 23-25) comprising, receiving “a first transmission” from the receiver (see col.4, lines 34-35), estimating characteristics of the communication link based on the received first transmission (see col.4, lines 35-37),

coding and modulating the data based on one or more coding and modulation schemes to provide modulation symbols (see Fig.1)

preconditioning the modulation symbols based on weights derived at least in part from the estimated characteristics of the communication link (see col.5, lines 2-45) and

transmitting the preconditioned modulation symbols from the transmitter unit via the communication link to the receiver unit (see Fig.3).

Art Unit: 2634

Claim 4.

Bao et al discloses transmitting pilot reference from the transmitter to the receiver. See col. 5, lines 47-49.

Claim 5.

Bao et al discloses implementing OFDM (see col.1, lines 40-44 and col.6, lines 4-10) which uses a plurality of frequency subchannels.

Claim 8.

In a wireless communication, a transmission signal travels via a plurality of propagation paths between the transmitter antenna and the receiver antenna.

Claim 9.

The estimated channel parameters (see col.4, lines 34-38) “relate to frequency response of the propagation paths used to transmit the data to the receiver unit” since they are a representation of a frequency response of a communication channel.

Claim 10.

Bao et al discloses that the first transmission from the receiver is a training sequence, i.e., “a pilot reference,” see col. 4, lines 34-38.

Claim 17.

Bao et al discloses a multiple variable QAM antennal elements (see col.5, line 66- col.6, line 3) describing transmitting data via a plurality of data streams coded and modulated with a respective coding and modulation scheme.

Claim 29.

Art Unit: 2634

Bao et al discloses transmitting a training sequence, i.e., “pilot data,” on a downlink to the receiver. See col. 5, lines 47-49.

Claim 30.

Bao et al describes a spatial diversity receiver in a TDD communication system (see col. 6, lines 36-39), which is well established to have a plurality of antennas, a corresponding number of front end units, a spatial processor to process the received signal based on the channel characteristics and a decoder for decoding the received signal.

Claim 31.

Bao et al describes the receiver sending back its estimate of channel to the transmitter, implying that the receiver includes “a channel state information processor” for estimate the channel characteristics and “a transmit data processor” for sending the estimated channel parameters back to the transmitter.

Claim 32.

Bao et al describes that the receiver transmits a training sequence, i.e., “a pilot data,” on an uplink, i.e., from the receiver to the transmitter. See col. 5, lines 47-49.

Claim 33.

Bao et al describes the receiver sending back its estimate of channel to the transmitter. See col.4, lines 28-34.

Claim 35.

Bao et al discloses the modulated signals received by the receiver is generated by the transmitter (see Fig.3) comprising the steps of

Art Unit: 2634

coding and modulating the data based on one or more coding and modulation schemes to provide modulation symbols (see Fig.1)

preconditioning the modulation symbols based on weights derived at least in part from the estimated characteristics of the communication link (see col.5, lines 2-45) and

transmitting the preconditioned modulation symbols from the transmitter unit via the communication link to the receiver unit (see Fig.3).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6,7,13,14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bao et al as applied to claim 1 above in view of Lozano et al (US 6,778,612).

Claim 6.

Bao et al discloses all the subject matter claimed, as explained in connection with claim 1 above, except for MIMO comprising a plurality of spatial subchannels. Lozano et al describes that it is well established that an MIMO system improves transmission capacity as compared to a single antenna. See col. 1, lines 15-19. Thus, it would have been obvious to one skilled in the art at the time the invention was made to provide MIMO to the communication system of Bao et al for the purpose of increasing channel capacity as taught by Lozano et al.

Claim 7.

Art Unit: 2634

Bao et al discloses implementing OFDM (see col.1, lines 40-44 and col.6, lines 4-10) which uses a plurality of frequency subchannels.

Claim 13.

Bao et al discloses that the first transmission from the receiver is a training sequence, i.e., “a pilot reference,” col. 4, lines 34-38.

Claim 14.

Bao fails to disclose using a subset of frequencies for transmitting the pilot reference. However, it would have been an obvious matter of design choice to select a subset of frequencies, depending on the number of channels selected to transmit data. Furthermore, applicant fails to disclose any advantages of using a subset instead of all the frequency channels for the estimation of the channel parameters, lacking criticality.

5. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bao et al as applied to claim 5.

Claim 11.

Bao et al discloses all the claimed subject matter, as explained in connection with claim 5 above, but is silent on the channels used to transmit the pilot reference. However, although Bao et al does not describe that the all frequency channels are used to transmit a pilot reference, it would have been a first approach that all the frequency channels over which data is to be transmitted are used to transmit the pilot reference since it is the objective of the pilot reference to estimate channel parameters.

Claim 12.

Bao fails to disclose using a subset of frequencies for transmitting the pilot reference. However, it would have been an obvious matter of design choice to select a subset, depending on the number of channels selected to transmit data. Furthermore, applicant fails to disclose any advantages of using a subset instead of all the frequency channels for the estimation of the channel parameters.

6. Claims 16 and 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bao et al as applied to claim 1 above and in view of Vedrine (US 6,707,808).

Claims 16 and 23.

Bao et al discloses all the claimed subject matter, as explained in connection with claim 1 above, but fails to teach receiving an indication of link quality and selecting the coding and modulation schemes based on the current channel quality. Vedrine teaches using an appropriate modulation and coding scheme depending on the current channel quality (see col.5, lines 42-45). Thus, it would have been obvious to one skilled in the art at the time the invention was made to receive an indication of link quality and select the coding and modulation schemes of Bao et al's transmitter based on the current channel quality as taught by Vedrine for the purpose of using an optimum coding and modulation.

Claim 18

Bao et al discloses estimating a link quality at the receiver and provided to the transmitter. See col. 4, lines 28-33.

Claim 19.

Bao et al discloses estimating a link quality at the transmitter. See col.4, lines 34-42.

Claims 20 and 21.

Art Unit: 2634

SNR is a most commonly used measure of a link quality and thus its use would have been obvious.

Claim 22.

Since a different modulation scheme carries a different data rate. The received link quality is indicative of a particular data rate to be used.

Allowable Subject Matter

7. Claims 2,3,15,28 and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 24,25 are allowed.

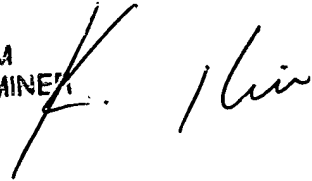
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Y Kim whose telephone number is 571-272-3039. The examiner can normally be reached on 8AM --5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2634

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KEVIN KIM
PATENT EXAMINER

A handwritten signature in black ink, appearing to read 'Kevin Kim', is written over the printed name and title.